Spearman Rank Correlation Coefficient

Critical Values for the Spearman Rank Correlation Coefficient

Two-Tail Test

							Numbers of Observations									
	5	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
5% level	1.000	0.886	0.786	0.738	0.700	0.648	0.618	0.587	0.860	0.538	0.521	0.503	0.488	0.474	0.460	0.447
1% level	na	1.000	0.929	0.881	0.833	0.794	0.755	0.727	0.703	0.679	0.657	0.635	0.618	0.600	0.584	0.570

The statistic requires at least 5 observations to ascertain differences in ranks at the 95% confidence level.

# of observations greater than 20 - rely on PRD measure

Parcel	Sale Date	Sale Price	Adj Price	Rank	2006 AV TOTAL	Rank	AV / SP	VAR	squared Diff. in Ranks
Example #1									
a	11/23/2005	310,000	310,000	3	260,000	2	0.84	0.0964	1
b	10/12/2004	10,500,000	10,500,000	12	9,000,000	12	0.86	0.0779	-
c	8/13/2003	1,400,000	1,497,172	9	1,319,400	8	0.88	0.0538	1
d	10/15/2005	405,000	405,000	5	362,200	5	0.89	0.0408	-
e	4/29/2005	300,000	300,000	2	269,200	3	0.90	0.0378	1
f	11/9/2003	330,000	348,929	4	315,900	4	0.91	0.0297	-
g	10/17/2005	725,000	725,000	7	699,500	7	0.96	0.0297	-
h	3/18/2005	3,500,000	3,500,000	11	3,631,400	11	1.04	0.1025	-
i	8/14/2003	230,000	245,932	1	257,100	1	1.05	0.1103	-
j	8/9/2004	1,900,000	1,900,000	10	2,225,000	10	1.17	0.2360	-
k	1/29/2004	500,000	500,000	6	627,000	6	1.25	0.3189	-
l	10/15/2004	1,350,000	1,350,000	8	1,750,000	9	1.30	0.3612	1

Count =12

Median	0.94	4	sum
COD	13.32%		
PRD	1.046		

Spearman Rank Correlation Coefficient

Test Statistic = $\dfrac{1-(6*T)}{n*(n*n-1)}$ $= \dfrac{1-(6*4)}{12*(144-1)}$

T = sum of squares of differences in ranks for each pair.

N = number of observations

= -0.0134

Comment:
Since the test statistic is less than the critical value of + or - 0.587 we can not reject the hypothesis of similar assessments for high and low-valued property.
The PRD measure indicating regressive assessments is invalid.

Ties in ranks can generally be handled by assigning the mid-value to each tie, such as two observations are tied at the 5th and 6th rank, so both would be assigned a value of 5.5 (5+6=11/2 = 5.5)

Reference P. Sprent, "Applied Nonparametric Statistical Methods", 2nd edition, 1993, pages 172-175.

Parcel	Sale Date	Sale Price	Adj Price	Rank	2006 AV TOTAL	Rank	AV / SP	VAR	squared Diff. in Ranks
Example #2									
a	11/23/2005		351,000	9	277,000	6	0.79	0.1459	9
b	10/12/2004		400,000	12	325,000	8	0.81	0.1226	16
c	8/13/2003		310,000	6	235,000	1	0.76	0.1770	25
d	10/15/2005		365,000	10	280,000	7	0.77	0.1680	9
e	4/29/2005		300,000	4	405,000	11	1.35	0.4149	49
f	11/9/2003		333,000	7	375,000	10	1.13	0.1910	9
g	10/17/2005		307,000	5	410,000	12	1.34	0.4004	49
h	3/18/2005		335,000	8	240,000	2	0.72	0.2187	36
i	8/14/2003		245,932	1	252,000	5	1.02	0.0896	16
j	8/9/2004		275,000	3	242,500	3	0.88	0.0533	-
k	1/29/2004		375,000	11	360,000	9	0.96	0.0249	4
l	10/15/2004		270,000	2	248,000	4	0.92	0.0166	4

Count =12

Median	0.90	226 sum
COD	18.73%	
PRD	1.010	

Spearman Rank Correlation Coefficient

Test Statistic = $\frac{1-(6*T)}{n*(n*n-1)}$ $= \frac{1-(6*226)}{12*(144-1)}$

T = sum of squares of differences in ranks for each pair.

N = number of observations

= -0.789627

Comment:

Since the test statistic exceeds the critical value of + or - 0.587 we reject the hypothesis of similar assessments for high and low-valued property.

The PRD measure indicating similar assessments of high and low-valued property is invalid.

Comments for use:

Rank the sales prices of the parcels that sold from low to high and assign the ranks
Likewise with the ranks of the parcel assessments from low to high.
The test basically looks at differences between ranks
Count the number of observations and apply the formula